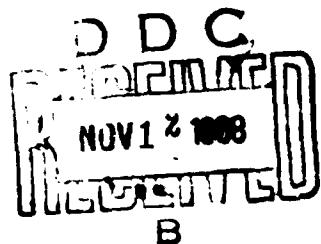


**AD 677195**

SEF-TR-68-1

**THE OCCURRENCE AND KNOWN HUMAN-DISEASE RELATIONSHIPS  
OF MOSQUITOES ON USAF INSTALLATIONS  
IN THE REPUBLIC OF VIETNAM**

July 1968



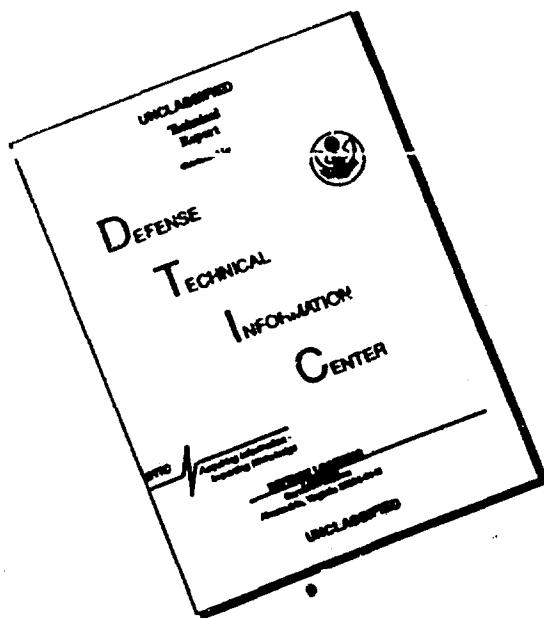
**Distribution of this Document is Unlimited**

**USAF 5th Epidemiological Flight  
Aerospace Medical Division  
Air Force Systems Command  
APO San Francisco 96528**

Reproduced by the  
**CLEARINGHOUSE**  
for Federal Scientific & Technical  
Information Springfield Va. 22151

31

# **DISCLAIMER NOTICE**



**THIS DOCUMENT IS BEST  
QUALITY AVAILABLE. THE COPY  
FURNISHED TO DTIC CONTAINED  
A SIGNIFICANT NUMBER OF  
PAGES WHICH DO NOT  
REPRODUCE LEGIBLY.**

**BLANK PAGE**

## NOTICES

When U.S. Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Qualified requesters may obtain copies from the Defense Documentation Center (DDC), Cameron Station, Alexandria, Virginia 22314. Others will be expedited if placed through the librarian or other person designated to request documents from DDC (formerly ASTIA).

SECTION 1	
REF ID:	WHITE SECTION <input checked="" type="checkbox"/>
DOC	DUFF SECTION <input type="checkbox"/>
UNARMED	<input type="checkbox"/>
AMMUNITION	<input type="checkbox"/>
BY	
DISTRIBUTION/AVAILABILITY CODE	
DOC	AVAIL. REG/ SPECIAL
1	

**THE OCCURRENCE AND KNOWN HUMAN-DISEASE RELATIONSHIPS  
OF MOSQUITOES ON USAF INSTALLATIONS  
IN THE REPUBLIC OF VIETNAM**

**DALE W. PARRISH, Major, USAF, BSC**

**Distribution of this Document is Unlimited**

#### **FOREWORD**

This research was accomplished at the 5th Epidemiological Flight under Project 6321, Task 02, and is part of the program for support of USAF operations in Southeast Asia.

The author acknowledges the careful and skillful technical assistance of SMSgt John P. Burns, J. L. Libay and R. C. Basio.

This report has been reviewed and is accepted.



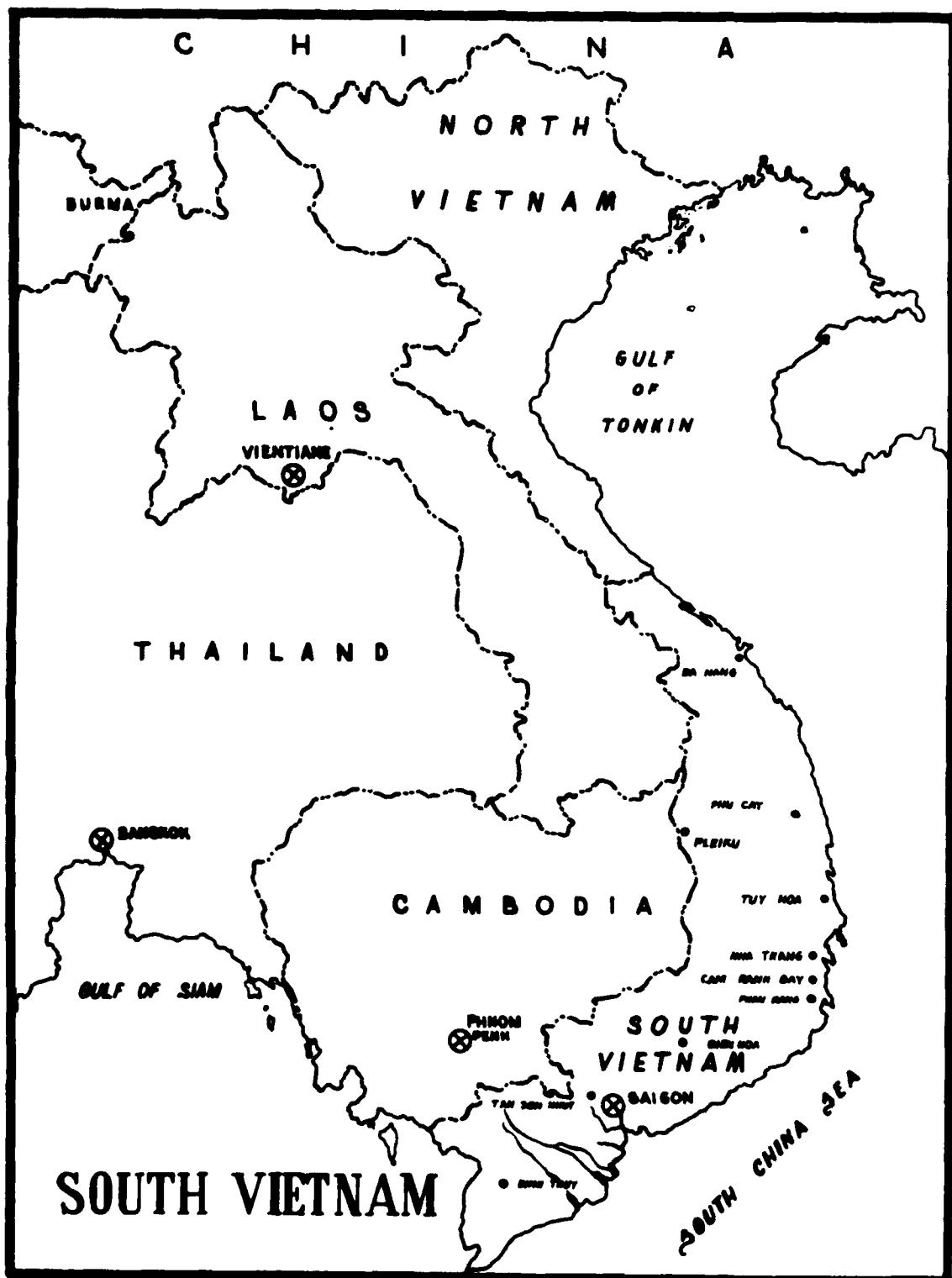
PAUL W. MUSGRAVE  
Colonel, USAF, MC  
Commander

#### **ABSTRACT**

Data are presented on the occurrence and human-disease relationships of mosquitoes on USAF installations located in the Republic of Vietnam.

The information contained in this report is based upon the identification of mosquito specimens collected and submitted to the USAF 5th Epidemiological Flight by USAF Military Public Health Service personnel from 10 USAF installations in RVN over a 24-month period between 1 June 1966 and 1 June 1968. Mosquito surveys were accomplished on a routine basis in connection with the conduct of disease-vector surveillance and control programs in compliance with the objectives of the USAF Aerospace Medicine Program to prevent and control vector-borne diseases.

A total of 93 different species of mosquitoes were identified from all collections. Of this number, 26 species or 27.9 percent, are known vectors of human disease.



# THE OCCURRENCE AND KNOWN HUMAN-DISEASE RELATIONSHIPS OF MOSQUITOES ON USAF INSTALLATIONS IN THE REPUBLIC OF VIETNAM

## SECTION I

### INTRODUCTION

The data presented herein are based upon the identification of mosquito specimens collected and submitted to the USAF 5th Epidemiological Flight by USAF Military Public Health Service Personnel from 10 U. S. Air Force Installations in the Republic of Vietnam over a 20-month period, between 1 June 1966 and 1 June 1968. The locations of installations participating in these surveys are shown in Figure I.

Mosquito surveys were accomplished on a routine basis in connection with the conduct of disease-vector surveillance and control programs in compliance with the objectives of the USAF Aerospace Medicine Program to prevent and control vector-borne diseases.

Information derived from these continuing surveys on the occurrence and seasonal abundance of specific species provides the Base Preventive Medicine Officer with the necessary data to evaluate the medical and economical importance of a species, to establish the vector-disease relationship, to maintain vigilance over potential vectors and to recommend effective and practical means of control.

## SECTION II

### METHODS

Adult and immature forms were collected at each installation on a routine basis utilizing standard entomological techniques. Immature forms were collected from two representative aquatic environments, while mosquito light traps were operated to collect adult mosquitoes at a minimum of two representative locations. Collected specimens were preserved, packaged and mailed to the 5th Epidemiological Flight in accordance with standard entomological procedures.

Stereoscopic examinations were made of all specimens and species determinations rendered by entomology specialists trained in mosquito taxonomy.

## SECTION III

### DISCUSSION

A total of 94 different species of mosquitoes were identified from all collections received from Air Force Installations in the Republic of Vietnam. (Table I). Of this number, 26 species or 27.9 percent are known vectors of human disease. (Table II). The occurrence of species by month over a 24-month period is listed in Table III.

Mosquito-borne diseases, with the exception of malaria, have not been as serious in Vietnam as had been expected. Dengue and encephalitis are present, but little or no filariasis or hemorrhagic fever has been reported. The total number of confirmed malaria cases in U. S. Forces during 1965-1966 has exceeded 10,000 (1).

The distribution of malaria in RVN is highly discontinuous. Incidence is very low in most of the coastal plain including the cities and delta. In parts of the foothills and highlands the attack rate is extremely high. Most of the military malaria is contracted outdoors rather than indoors and there is considerable evidence that the endophilic *Anopheles minimus* has not been a significant vector. The exophilic species, *A. aconitus*, *A. maculatus*, *A. jeyporiensis canidiensis*, and in limited areas, *A. balabacensis*, are believed to be the most important vectors affecting military personnel (1).

The extraordinary amount of personnel movements is causing a redistribution of malaria from the hyperendemic foci of the interior to all parts of RVN and beyond. Wherever suitable vectors occur malaria has increased as new reservoirs are established. The Navy reports that at least two cases of autochthonous malaria introduced from Vietnam have occurred on Guam. A major portion of the 517 cases of imported malaria reported in the United States during 1966 originated in Vietnam.

The amount of illness diagnosed as "fever of indetermined origin" (FUD) exceeds that of confirmed malaria and Army authorities have estimated that one-third or more of this may be dengue. The incidence of FUDs in military personnel of all military services in Southeast Asia has averaged 8% (2).

TABLE I  
LIST OF MOSQUITO SPECIES COLLECTED IN THE REPUBLIC OF VIETNAM

INSTALLATION	S P E C I E S
Bien Hoa	<i>Aedes mediolineatus</i> <i>Aedes poicilius</i> <i>Aedes vexans*</i> <i>Anopheles annularis</i> <i>Anopheles lesteri</i> <i>Anopheles peditaeniatus</i> <i>Anopheles sinensis*</i> <i>Anopheles splendidus</i> <i>Anopheles subpictus</i> <i>Anopheles vagus*</i> <i>Culex annulus*</i> <i>Culex bitaeniorhynchus*</i> <i>Culex brevipalpis</i>
Binh Thuy	<i>Aedes dux</i> <i>Aedes lineatopennis*</i> <i>Aedes nivencutellum</i> <i>Aedes poicilius</i> <i>Aedeomyia catasticta</i> <i>Anopheles aconitus*</i> <i>Anopheles argyropus</i> <i>Anopheles barbirostris*</i> <i>Anopheles campestris*</i> <i>Anopheles crawfordi</i> <i>Anopheles indiensis</i> <i>Anopheles lesteri</i> <i>Anopheles minimus*</i> <i>Anopheles nigerrimus*</i> <i>Anopheles peditaeniatus</i> <i>Anopheles sinensis*</i> <i>Anopheles subpictus</i> <i>Anopheles tessellatus*</i> <i>Anopheles umbrosus*</i> <i>Anopheles vagus*</i> <i>Culex annulus*</i> <i>Culex bitaeniorhynchus*</i> <i>Culex brevipalpis</i> <i>Culex fuscans</i>
Cam Ranh Bay	<i>Aedes albolineatus</i> <i>Aedes albopictus*</i> <i>Aedes imprimens</i> <i>Aedes pseudoalbopictus</i> <i>Aedes vexans*</i> <i>Aedeomyia catasticta</i> <i>Anopheles rawfordi</i> <i>Anopheles karwari</i>
	<i>Culex fuscans</i> <i>Culex fuscocephalus*</i> <i>Culex gelidus*</i> <i>Culex rubithoracis</i> <i>Culex pipiens quinquefasciatus*</i> <i>Culex sinensis*</i> <i>Culex tritaeniorhynchus*</i> <i>Culex whitmorei</i> <i>Ficalbia hybrida</i> <i>Ficalbia luzonensis</i> <i>Mansonia crassipes</i> <i>Mansonia ochracea</i> <i>Mansonia uniformis*</i>  <i>Culex fuscocephalus*</i> <i>Culex gelidus*</i> <i>Culex pholetei</i> <i>Culer nigropunctatus</i> <i>Culex pseudovishnui</i> <i>Culex pipiens quinquefasciatus*</i> <i>Culex raptor</i> <i>Culex sinensis*</i> <i>Culex tritaeniorhynchus*</i> <i>Ficalbia chamberlaini</i> <i>Ficalbia hybrida</i> <i>Ficalbia luzonensis</i> <i>Ficalbia minima</i> <i>Hodgesia malayi</i> <i>Mansonia annulifera*</i> <i>Mansonia crassipes</i> <i>Mansonia nigrosignata</i> <i>Mansonia ochracea</i> <i>Mansonia uniformis*</i> <i>Uranotaenia annandalei</i> <i>Uranotaenia campestris</i> <i>Uranotaenia maxima</i> <i>Uranotaenia obscura</i>  <i>Anopheles lesteri</i> <i>Anopheles peditaeniatus</i> <i>Anopheles sinensis*</i> <i>Anopheles subpictus</i> <i>Culex annulus*</i> <i>Culex bitaeniorhynchus*</i> <i>Culex fuscans</i> <i>Culex fuscocephalus*</i>

	<i>Culex gelidus*</i>	<i>Ficalbia chamberlaini</i>
	<i>Culex mimeticus</i>	<i>Ficalbia luzonensis</i>
	<i>Culex pseudosinensis</i>	<i>Mansonia crassipes</i>
	<i>Culex pseudovishnui</i>	<i>Mansonia ochracea</i>
	<i>Culex quadripalpis</i>	<i>Mansonia uniformis*</i>
	<i>Culex pipiens quinquefasciatus*</i>	<i>Toxorhynchites splendens</i>
	<i>Culex tritaeniorhynchus*</i>	<i>Tripteroides aranoides</i>
	<i>Culex whitei</i>	
DaNang	<i>Anopheles aronitus</i>	<i>Culex fuscocephalus*</i>
	<i>Anopheles sinensis*</i>	<i>Culex gelidus*</i>
	<i>Anopheles vagus*</i>	<i>Culex rubithoracis</i>
	<i>Culex annulus*</i>	<i>Culex pseudovishnui</i>
	<i>Culex bitaeniorhynchus*</i>	<i>Culex pipiens quinquefasciatus*</i>
	<i>Culex fuscanus</i>	<i>Culex tritaeniorhynchus*</i>
Nha Trang	<i>Aedes chrysolineatus</i>	<i>Culex brevipalpis</i>
	<i>Aedes dux</i>	<i>Culex fuscocephalus*</i>
	<i>Aedes gubernatoris</i>	<i>Culex gelidus*</i>
	<i>Aedes lineatopennis*</i>	<i>Culex khazani</i>
	<i>Aedes pseudoalbopictus</i>	<i>Culex phoeler</i>
	<i>Aedes vexans*</i>	<i>Culex nigropunctatus</i>
	<i>Aedes vigilax*</i>	<i>Culex pseudosinensis</i>
	<i>Anopheles aconitus*</i>	<i>Culex pseudovishnui</i>
	<i>Anophcles annularis</i>	<i>Culex pipiens quinquefasciatus*</i>
	<i>Anopheles argyropus</i>	<i>Culex sinensis*</i>
	<i>Anopheles crawfordi</i>	<i>Culex sitiens*</i>
	<i>Anopheles lesteri</i>	<i>Culex tritaeniorhynchus*</i>
	<i>Anopheles minimus*</i>	<i>Culex whitei</i>
	<i>Anopheles nigerrimus*</i>	<i>Culex whitmorei</i>
	<i>Anopheles peditaeniatus</i>	<i>Ficalbia chamberlaini</i>
	<i>Anopheles philippinensis</i>	<i>Ficalbia luzonensis</i>
	<i>Anopheles sinensis*</i>	<i>Malaya jacobsoni</i>
	<i>Anopheles subpictus</i>	<i>Mansonia crassipes</i>
	<i>Anopheles tessellatus*</i>	<i>Mansonia uniformis*</i>
	<i>Anopheles vagus*</i>	<i>Uranotaenia annandalei</i>
	<i>Culex annulus*</i>	<i>Uranotaenia campestris</i>
	<i>Culex bitaeniorhynchus*</i>	<i>Uranotaenia macfarlanei</i>
Phan Rang	<i>Aedes albopictus*</i>	<i>Anopheles annularis</i>
	<i>Aedes alboscutellatus</i>	<i>Anopheles argyropus</i>
	<i>Aedes dux</i>	<i>Anopheles crawfordi</i>
	<i>Aedes lineatopennis*</i>	<i>Anopheles indiensis</i>
	<i>Aedes mediolineatus</i>	<i>Anopheles lesteri</i>
	<i>Aedes nireoscutellum</i>	<i>Anopheles minimus*</i>
	<i>Aedes pseudoalbopictus</i>	<i>Anopheles nigerrimus*</i>
	<i>Aedes taeniorhynchoides</i>	<i>Anopheles pallidus</i>
	<i>Aedes vexans*</i>	<i>Anopheles peditaeniatus</i>
	<i>Aedes vigilax*</i>	<i>Anopheles philippinensis</i>
	<i>Aedomyia catasticta</i>	<i>Anopheles sinensis*</i>
	<i>Anopheles aconitus*</i>	<i>Anopheles subpictus</i>

	<i>Anopheles tessellatus*</i>	<i>Culex pseudosinensis</i>
	<i>Anopheles vagus*</i>	<i>Culex pseudovishnui</i>
	<i>Culex annularis*</i>	<i>Culex pipiens quinquefasciatus*</i>
	<i>Culex bitaeniorhynchus*</i>	<i>Culex sitiens*</i>
	<i>Culex fuscans</i>	<i>Culex tritaeniorhynchus*</i>
	<i>Culex fuscoccephalus*</i>	<i>Culex whitmorei</i>
	<i>Culex gelidus*</i>	<i>Mansonia crassipes</i>
	<i>Culex khasani</i>	<i>Mansonia ochracea</i>
	<i>Culex minor</i>	<i>Mansonia uniformis*</i>
	<i>Culex pholetier</i>	<i>Uranotaenia maxima</i>
	<i>Culex reidi</i>	<i>Uranotaenia obscura</i>
	<i>Culex rubithoracis</i>	<i>Uranotaenia recondita</i>
	<i>Culex nigropunctatus</i>	
Pleiku	<i>Aedes albopictus*</i>	<i>Anopheles vagus*</i>
	<i>Aedes gubernatoris</i>	<i>Armigeres flavus</i>
	<i>Aedes laniger</i>	<i>Armigeres subalbatus*</i>
	<i>Aedes lineatopennis*</i>	<i>Culex annulus*</i>
	<i>Aedes mediolineatus</i>	<i>Culex bitaeniorhynchus*</i>
	<i>Aedes nivoscutellum</i>	<i>Culex brevipalpis</i>
	<i>Aedes ostentatio</i>	<i>Culex fuscans</i>
	<i>Aedes pseudoalbopictus</i>	<i>Culex fuscoccephalus*</i>
	<i>Aedes vexans*</i>	<i>Culex gelidus*</i>
	<i>Aedes vittatus</i>	<i>Culex pholetier</i>
	<i>Aedeomyia catasticta</i>	<i>Culex nigropunctatus</i>
	<i>Anopheles aconitus*</i>	<i>Culex pseudosinensis</i>
	<i>Anopheles annularis</i>	<i>Culex pseudovishnui</i>
	<i>Anopheles argyropus</i>	<i>Culex pipiens quinquefasciatus*</i>
	<i>Anopheles crawfordi</i>	<i>Culex sinensis*</i>
	<i>Anopheles indiensis</i>	<i>Culex sitiens*</i>
	<i>Anopheles karwari</i>	<i>Culex tritaeniorhynchus*</i>
	<i>Anopheles lesteri</i>	<i>Culex whitei</i>
	<i>Anopheles maculatus*</i>	<i>Culex whitmorei</i>
	<i>Anopheles minimus*</i>	<i>Ficalbia chamberlaini</i>
	<i>Anopheles nigerimus*</i>	<i>Hodgesia malayi</i>
	<i>Anopheles pallidus</i>	<i>Mansonia crassipes</i>
	<i>Anopheles peditaeniatus</i>	<i>Mansonia uniformis*</i>
	<i>Anopheles philippinensis</i>	<i>Uranotaenia annandalei</i>
	<i>Anopheles sinensis*</i>	<i>Uranotaenia macfarlanei</i>
	<i>Anopheles splendidus</i>	<i>Uranotaenia maxima</i>
	<i>Anopheles subpictus</i>	
Phu Cat	<i>Aedes aegypti*</i>	<i>Aedes vittatus</i>
	<i>Aedes amesi</i>	<i>Aedeomyia catasticta</i>
	<i>Aedes lineatopennis*</i>	<i>Anopheles aconitus*</i>
	<i>Aedes longirostris</i>	<i>Anopheles annandalei interruptus</i>
	<i>Aedes mediolineatus</i>	<i>Anopheles annularis</i>
	<i>Aedes ostentatio</i>	<i>Anopheles argyropus</i>
	<i>Aedes poicilius</i>	<i>Anopheles barbirostris*</i>
	<i>Aedes vexans</i>	<i>Anopheles campestris*</i>

<i>Anopheles crawfordi</i>	<i>Culex fuscatus</i>
<i>Anopheles indiensis</i>	<i>Culex fuscocephalus*</i>
<i>Anopheles jeyporiensis candidiensis*</i>	<i>Culex gelidus*</i>
<i>Anopheles karwari</i>	<i>Culex khazani</i>
<i>Anopheles lesteri</i>	<i>Culex incomptus</i>
<i>Anopheles minimus*</i>	<i>Culex peytoni</i>
<i>Anopheles nigerrimus*</i>	<i>Culex pholeti</i>
<i>Anopheles pallidus</i>	<i>Culex pseudosinensis</i>
<i>Anopheles peditaeniatus</i>	<i>Culex pseudovishnui</i>
<i>Anopheles philippensis</i>	<i>Culex pipiens quinquefasciatus*</i>
<i>Anopheles sinensis*</i>	<i>Culex sinensis*</i>
<i>Anopheles subpictus</i>	<i>Culex tritaeniorhynchus*</i>
<i>Anopheles tessellatus*</i>	<i>Culex whitmorei</i>
<i>Anopheles umbrosus*</i>	<i>Ficalbia chamberlaini</i>
<i>Anopheles vagus*</i>	<i>Ficalbia luzonensis</i>
<i>Anopheles varuna</i>	<i>Ficalbia minima</i>
<i>Armigeres subalbatus*</i>	<i>Mansonia crassipes</i>
<i>Culex annulus*</i>	<i>Mansonia uniformis*</i>
<i>Culex bitaeniorhynchus*</i>	<i>Uranotaenia campestris</i>
<i>Culex brevipalpis</i>	<i>Uranotaenia maxima</i>

**Tan Son Nhut**

<i>Aedes aegypti</i>	<i>Culex brevipalpis</i>
<i>Aedes dux</i>	<i>Culex fuscatus</i>
<i>Aedes vexans</i>	<i>Culex fuscocephalus*</i>
<i>Anopheles aconitus*</i>	<i>Culex gelidus*</i>
<i>Anopheles annularis</i>	<i>Culex pipiens quinquefasciatus*</i>
<i>Anopheles crawfordi</i>	<i>Culex raptor</i>
<i>Anopheles philippensis</i>	<i>Culex sinensis*</i>
<i>Anopheles sinensis*</i>	<i>Culex tritaeniorhynchus*</i>
<i>Anopheles subpictus</i>	<i>Culex whitmorei</i>
<i>Anopheles tessellatus*</i>	<i>Ficalbia chamberlaini</i>
<i>Anopheles vagus*</i>	<i>Malaya jacobsoni</i>
<i>Culex annulus*</i>	

**Tuy Hoa**

<i>Aedes dux</i>	<i>Culex annulus*</i>
<i>Aedes lineatopennis*</i>	<i>Culex bitaeniorhynchus*</i>
<i>Aedes longirostris</i>	<i>Culex gelidus*</i>
<i>Aedes vexans*</i>	<i>Culex pipiens quinquefasciatus*</i>
<i>Aedomyia catasticta</i>	<i>Culex tritaeniorhynchus*</i>
<i>Anopheles annularis</i>	<i>Culex whitmorei</i>
<i>Anopheles crawfordi</i>	<i>Mansonia crassipes</i>
<i>Anopheles peditaeniatus</i>	<i>Mansonia ochracea</i>
<i>Anopheles sinensis*</i>	<i>Mansonia uniformis</i>
<i>Anopheles subpictus</i>	<i>Tripteroides aranoides</i>
<i>Anopheles vagus*</i>	

\* Disease Vectors

TABLE II

KNOWN HUMAN DISEASE RELATIONSHIPS OF MOSQUITOES  
COLLECTED ON 7TH AIR FORCE INSTALLATIONS (RVN)

**AEDES AEGYPTI**

*Disease Relationships:* Primary vector of DENGUE and CHIKUNGUNYA FEVER; found naturally infected with *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**AEDES ALBOPICTUS**

*Disease Relationships:* Primary vector of DENGUE and CHIKUNGUNYA FEVER; secondary vector of JAPANESE "B" ENCEPHALITIS; primary vector of *Dirofilaria immitis* (TROPICAL EOSINOPHILIA).

**AEDES LINEATOPENNIS**

*Disease Relationships:* Low potential vector of *Brugia malayi* (MALAYAN FILARIASIS) and *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**AEDES VEXANS**

*Disease Relationships:* Primary vector of *Dirofilaria immitis* (TROPICAL EOSINOPHILIA); secondary vector of JAPANESE "B" ENCEPHALITIS.

**AEDES VIGILAX**

*Disease Relationships:* Primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS) and SINDBIS FEVER.

**ANOPHELES ACONITUS**

*Disease Relationships:* Secondary vector of MALARIA in the highlands.

**ANOPHELES BARBIROSTRIS**

*Disease Relationships:* Primary vector of *Burgia malayi* (MALAYAN FILARIASIS); secondary vector of *Brugia pahangi* (TROPICAL EOSINOPHILIA).

**ANOPHELES CAMPESTRIS**

*Disease Relationships:* Primary vector of *Brugia malayi* (MALAYAN FILARIASIS); secondary vector of *Brugia pahangi* (TROPICAL EOSINOPHILIA).

**ANOPHELES JEYPORIENSIS CANDIDIENSIS**

*Disease Relationships:* Primary vector of highland MALARIA. Possible vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**ANOPHELES MACULATUS**

*Disease Relationships:* Secondary vector of MALARIA in the highlands.

**ANOPHELES MINIMUS**

*Disease Relationships:* Primary vector of highland MALARIA; secondary vector of coastal MALARIA (in sand dune seepage areas); primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**ANOPHELES NIGERRIMUS**

*Disease Relationships:* May possibly transmit MALARIA. Some positive records represent confusion between this species and *Anopheles sinensis*.

**ANOPHELES SINENSIS**

*Disease Relationships:* Primary vector of MALARIA in delta and coastal areas. Primary vector of *Brugia malayi* (MALAYAN FILARIASIS) and *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**ANOPHELES TESSELLATUS**

*Disease Relationships:* Secondary vector of MALARIA in delta and coastal areas.

**ANOPHELES UMBROSUS**

*Disease Relationships:* Possible jungle vector of MALARIA in the lowlands.

**ANOPHELES VAGUS**

*Disease Relationships:* Vector of MALARIA in delta and coastal areas.

**ARMIGERES SUBALBATUSS**

*Disease Relationships:* Primary vector of *Brugia pahangi* (MALAYAN FILARIASIS).

**CULEX ANNULUS**

*Disease Relationships:* Vector of JAPANESE "B" ENCEPHALITIS.

**CULEX BITAENIORHYNCHUS**

*Disease Relationships:* Primary vector of SINDBIS FEVER; secondary vector of JAPANESE "B" ENCEPHALITIS.

**CULEX FUSCOCEPHALUS**

*Disease Relationships:* Primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**CULEX GELIDUS**

*Disease Relationships:* Primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS), CHIKUNGUNYA FEVER, JAPANESE "B" ENCEPHALITIS and GETAH VIRUS.

**CULEX PIPiens QUINQUEFASCIATUS**

*Disease Relationships:* Primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS), *Brugia malayi* (MALAYAN FILARIASIS), *Dirofilaria immitis* (TROPICAL EOSINOPHILIA); secondary vector of JAPANESE "B" ENCEPHALITIS.

**CULEX SINENSIS**

*Disease Relationships:* Low potential vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**CULEX SITIENS**

*Disease Relationships:* Possible vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS) and, based upon small samplings, of *Brugia malayi* (MALAYAN FILARIASIS).

**CULEX TRITAENIORHYNCHUS**

*Disease Relationships:* Primary vector of JAPANESE "B" ENCEPHALITIS, CHIKUNGUNYA FEVER, SINDBIS FEVER, and GE-TAH VIRUS. Low potential vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS).

**MANSONIA ANNULIFERA**

*Disease Relationships:* Primary vector of *Brugia malayi* (MALAYAN FILARIASIS).

**MANSONIA UNIFORMIS**

*Disease Relationships:* Primary vector of *Wuchereria bancrofti* (BANCROFTIAN FILARIASIS), *Brugia malayi* (MALAYAN FILARIASIS), *Brugia pahangi* (TROPICAL EOSINOPHILIA) and CHIKUNGUNYA FEVER.

TABLE III - A  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS

SPECIES	MONTHS											
	1966			1967			1968			1969		
	NOV.	DEC.	JAN.	MAR.	APRIL	MAY	JUN.	JULY	SEPT.	OCT.	NOV.	
<i>Aedes mediovittatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes poicilus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Aedes vexans</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles annularis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles lesteri</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles peditaeniatus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles sinensis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles splendidus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles subpictus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Anopheles vagus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex annulus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex bitaeniorhynchus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex brevipalpis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex fuscans</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex fuscocephalus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex gelidus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex (Lophoceraomyia) rubithoracicus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex pipiens quinquefasciatus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex sinensis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex tritaeniorhynchus</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Culex whitmorei</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Ficalbia hybrida</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Ficalbia luzonensis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Mansonia crassipes</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Mansonia ochracea</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Mansonia uniformis</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

• = Species collected

NA = No collections attempted

TABLE III - B  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
BINH THUY, VIETNAM

SPECIES	MONTHS											
	1966			1967			1968			1969		
	MAY	JUN.	JULY	MAY	JUN.	JULY	MAY	JUN.	JULY	MAY	JUN.	JULY
<i>Aedes dux</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Aedes lineatopennis</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Aedes niveoscutellum</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Aedes poicilius</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Aedomyia catasticta</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles azonitus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles argyropus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles barbiostriis</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles campbelli</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles crawfordi</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles indiensis</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles lesteri</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles minimus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles redditinianus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles sinensis</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles subpictus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles tessellatus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles umbrovius</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Anopheles vagus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex annulus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex bitaeniorkynchus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex brevipalpis</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex fuscovenus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex fuscoccephalus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex gelidus</i>	z	z	z	z	z	z	z	z	z	z	z	z
<i>Culex (Lophocnomyia) photer</i>	z	z	z	z	z	z	z	z	z	z	z	z



TABLE III-C

OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS

CAM RANH BAY, VIETNAM

SPECIES	MONTHS																							
	1986				1987				1988				1989				1990				1991			
	MAY	JUN.	JULY	SEP.	MAY	JUN.	JULY	SEP.	MAY	JUN.	JULY	SEP.	MAY	JUN.	JULY	SEP.	MAY	JUN.	JULY	SEP.	MAY	JUN.	JULY	SEP.
<i>Aedes albolineatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes albopictus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes imprimens</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes pseudoalbopictus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes vexans</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedomyia catasticta</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles cruentandi</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles karevare</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles lesteri</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles pedtaeniatus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles sinensis</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles subpictus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex annulus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex bitaeniorynchus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex fuscans</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex fuscocephalus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex gelidus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex mimeticus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex pseudosinensis</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex pseudovishnui</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex quadripalpis</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex pipiens quinquefasciatus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex tritaeniorhynchus</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex whitei</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Ficalbia chamberlaini</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Ficalbia luzonensis</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Mansonia crassipes</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Mansonia ochracea</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Mansonia uniformis</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Toxorhynchites splendens</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
<i>Tripteroides annulipes</i>					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

P = Species collected

NA = No collections attempted

TABLE III - D  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
DA NANG, VIETNAM

SPECIES	MONTHS												
	1966			1967			1968			1969			
	MAY	JUN.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APRIL	MAY
<i>Anopheles aconitus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles sinensis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles ragus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex annularis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex bitaeniorhynchus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex fuscipes fuscipes</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex fuscipes thalassinus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex gelidus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex (Lophoceromyia) rubithorax</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex pseudovishnui</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex pipiens quinquefasciatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex tritaeniorhynchus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

P = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - E  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS

<i>Culex nigropunctatus</i>
<i>Culex pseudosinensis</i>
<i>Culex pseudovishnui</i>
<i>Culex pipiens quinquefasciatus</i>
<i>Culex sinensis</i>
<i>Culex tritaeniorhynchus</i>
<i>Culex whitei</i>
<i>Culex whitmorei</i>
<i>Ficalbia chamberlaini</i>
<i>Ficalbia luzonensis</i>
<i>Malaya jacobsoni</i>
<i>Mansonia crassipes</i>
<i>Mansonia uniformis</i>
<i>Uranotaenia annandalei</i>
<i>Uranotaenia campastris</i>
<i>Uranotaenia macfarlanei</i>

• = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - F  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
PHAN RANG, VIETNAM

SPECIES	MONTHS											
	1966			1967			1968			1969		
	MAY	JUN.	JULY	MAR.	APRIL	MAY	JUN.	JULY	MAR.	APRIL	MAY	
<i>Aedes albopictus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes alboscutellatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes dux</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes lineatopunctatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes mediolineatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes nivoscutellatum</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes pseudobimaculatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes tenuiorhynchoides</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes vexans</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedes vigilax</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Aedomyia calosticta</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles acutus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles annularis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles argyropus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles craufordi</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles indiensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles lesteri</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles minimus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles nigerrimus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles pallidus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles peditaeniatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles philippensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles sinensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles subpictus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles tessellatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles vagus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Culex annulatus</i>	N	N	N	N	N	N	N	N	N	N	N	N

<i>Culex bitaeniorthynchus</i>	z z
<i>Culex fuscipennis</i>	z z
<i>Culex fusconephalus</i>	z z
<i>Culex gelidus</i>	z z
<i>Culex khazani</i>	z z
<i>Culex (Lophoceraomyia) minor</i>	z z
<i>Culex (Lophoceraomyia) pholter</i>	z z
<i>Culex (Lophoceraomyia) reidi</i>	z z
<i>Culex (Lophoceraomyia) rubitho-</i>	z z
<i>racis</i>	z z
<i>Culex nigropunctatus</i>	z z
<i>Culex pseudostinensis</i>	z z
<i>Culex pseudovishnui</i>	z z
<i>Culex pipiens quinquefasciatus</i>	z z
<i>Culex sitiens</i>	z z
<i>Culex tritaeniorhynchus</i>	z z
<i>Culex whitmorei</i>	z z
<i>Mansonia crassipes</i>	z z
<i>Mansonia ochracea</i>	z z
<i>Mansonia uniformis</i>	z z
<i>Uranotaenia maxima</i>	z z
<i>Uranotaenia obscura</i>	z z
<i>Uranotaenia recordita</i>	z z

• = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - C  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
PLEIKU A. B. VIETNAM

SPECIES	MONTHS											
	1966			1967			1968			1969		
	JAN.	FEB.	MAR.	JAN.	FEB.	MAR.	JAN.	FEB.	MAR.	JAN.	FEB.	
<i>Aedes albopictus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes gubernatoris</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes taeniorhynchus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes lineatopennis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes mediovittatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes niveoscutellum</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes ostentatio</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes pseudothalassinus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes vexans</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes vitatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedomyia catasticta</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles aconitus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles annularis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles argyropus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles crassifrons</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles indiensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles karevoi</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles lesteri</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles maculatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles minimus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles nigerrimus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles pallidus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles pediniatus</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles philippensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles sinensis</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles splendens</i>	N	N	N	N	N	N	N	N	N	N	N	N
<i>Anopheles subpictus</i>	N	N	N	N	N	N	N	N	N	N	N	N

<i>Anopheles vagus</i>	
<i>Armigeres flavus</i>	
<i>Armigeres subbalbatus</i>	
<i>Culex annulipes</i>	
<i>Culex bitaeniorrhynchos</i>	
<i>Culex brevipalpis</i>	
<i>Culex fuscans</i>	
<i>Culex fuscovenustus</i>	
<i>Culex gelidus</i>	
<i>Culex (Lophoceraomyia) pholter</i>	
<i>Culex nigropunctatus</i>	
<i>Culex pseudosinensis</i>	
<i>Culex pseudostigmatius</i>	
<i>Culex pipiens quinquefasciatus</i>	
<i>Culex sinensis</i>	
<i>Culex sitiens</i>	
<i>Culex tritaeniorrhynchos</i>	
<i>Culex whitei</i>	
<i>Culex whitmorei</i>	
<i>Ficalbia chamberlini</i>	
<i>Hodgesia malayi</i>	
<i>Mansonia crassipes</i>	
<i>Mansonia uniformis</i>	
<i>Uranotaenia annandalei</i>	
<i>Uranotaenia macfarlanei</i>	
<i>Uranotaenia marima</i>	

• = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - H  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
PHU CAT, VIETNAM

SPECIES	MONTHS											
	1966			1967			1968			1969		
	MAY	JUN.	JULY	MAR.	APRIL	MAY	JUN.	JULY	SEPT.	OCT.	NOV.	DEC.
<i>Aedes aegypti</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes aimesi</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes lineatopennis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes longirostris</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes mediolineatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes ostentatic</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes poicilius</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes vexans</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes vittatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedeomyia catasticta</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles aconitus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles annandalei interruptus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles annularis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles argyrotopus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles barbirostris</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles campestris</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles crawfordi</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles indiensis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles jayporiensis candienseis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles karunari</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles lesteri</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles minimus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles nigerrimus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles pallidus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles peditaeniatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles philippensis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles sinensis</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles subpictus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles testiflatus</i>	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

<i>Anopheles umbrosus</i>	Z Z
<i>Anopheles tagus</i>	Z Z
<i>Anopheles varuna</i>	Z Z
<i>Armigeres subalbatus</i>	Z Z
<i>Culex bitaeniorthynchus</i>	Z Z
<i>Culex brevipalpis</i>	Z Z
<i>Culex fuscans</i>	Z Z
<i>Culex fuscocephalus</i>	Z Z
<i>Culex gelidus</i>	Z Z
<i>Culex khazani</i>	Z Z
<i>Culex (Lophoceromyia) incomptus</i>	Z Z
<i>Culex (Lophoceromyia) peytoni</i>	Z Z
<i>Culex (Lophoceromyia) pholetei</i>	Z Z
<i>Culex pseudosinensis</i>	Z Z
<i>Culex pseudovishnui</i>	Z Z
<i>Culex pipiens quinquefasciatus</i>	Z Z
<i>Culex sinensis</i>	Z Z
<i>Culex tritaeniorthynchus</i>	Z Z
<i>Culex whitmorei</i>	Z Z
<i>Ficalbia chamberlini</i>	Z Z
<i>Ficalbia luzonensis</i>	Z Z
<i>Ficalbia minima</i>	Z Z
<i>Mansonia crassipes</i>	Z Z
<i>Mansonia uniformis</i>	Z Z
<i>Uranotaenia campstris</i>	Z Z
<i>Uranotaenia maritima</i>	Z Z
<i>Uranotaenia obscurula</i>	Z Z

• = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - I  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS  
TAN SON NHUT, VIETNAM

SPECIES	MONTHS											
	1966			1967			1968			1969		
	MAY	JUN.	JULY	MAY	JUN.	JULY	MAY	JUN.	JULY	MAY	JUN.	JULY
<i>Aedes aegypti</i>	Z	z	z	Z	z	z	Z	z	z	Z	z	z
<i>Aedes dux</i>												
<i>Aedes vexans</i>												
<i>Anopheles aconitus</i>												
<i>Anopheles annularis</i>												
<i>Anopheles cruentifordi</i>												
<i>Anopheles pl. ibiannis</i>												
<i>Anopheles sinensis</i>												
<i>Anopheles subpictus</i>												
<i>Anopheles tessellatus</i>												
<i>Anopheles vexans</i>												
<i>Culex annuliferus</i>												
<i>Culex brevipalpis</i>												
<i>Culex fuscipennis</i>												
<i>Culex fuscovenustus</i>												
<i>Culex gelidus</i>												
<i>Culex pipiens quinquefasciatus</i>												
<i>Culex raptor</i>												
<i>Culex sinensis</i>												
<i>Culex tritaeniorhynchus</i>												
<i>Culex whitmorei</i>												
<i>Picardia chamberlaini</i>												
<i>Malaya jacobsoni</i>												

• = Species collected

N = Species not collected

NA = No collections attempted

TABLE III - J  
OCCURRENCE OF MOSQUITO SPECIES BY MONTH OVER A 24-MONTH PERIOD  
BASED ON LIGHT TRAP AND LARVAL COLLECTIONS

SPECIES	MONTHS																							
	1966				1967				1968				1969				1970				1971			
<i>Aedes dux</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes lineatopennis</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes longirostris</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedes vexans</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Aedomyia catasticta</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles annularis</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles crawfordi</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles pedemontanus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles sinensis</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles subpictus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Anopheles vagus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex annulus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex bitaeniorhynchus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex gelidus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex pipiens quinquefasciatus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex tritaeniorhynchus</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Culex whitmorei</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Mansonia crassipes</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Mansonia ochracea</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Mansonia uniformis</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
<i>Tripteroides annoides</i>	NA	NA	NA	NA	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

• = Species collected

NA = No collections attempted

NA = No collections attempted

**UNCLASSIFIED**

**Security Classification**

**DOCUMENT CONTROL DATA - R&D**

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) USAF 5th Epidemiological Flight Aerospace Medical Division (AFSC) APO San Francisco 96528		2a. REPORT SECURITY CLASSIFICATION <b>UNCLASSIFIED</b>
2b. GROUP N/A		
3. REPORT TITLE THE OCCURRENCE AND KNOWN HUMAN DISEASE RELATIONSHIPS OF MOSQUITOES ON USAF INSTALLATIONS IN THE REPUBLIC OF VIETNAM.		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final Report 1 June 1966 - 1 June 1968		
5. AUTHOR(S) (Last name, first name, initial) PARRISH, DALE W., Major, USAF, BSC		
6. REPORT DATE July 1968	7a. TOTAL NO. OF PAGES 2	7b. NO. OF REPS
8a. CONTRACT OR GRANT NO.	8b. ORIGINATOR'S REPORT NUMBER(S) 5EF -TR-68-1	
8c. PROJECT NO. 6321 e. Task No. 02 d.	8d. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) N/A	
10. AVAILABILITY/LIMITATION NOTICES Distribution of this document if unlimited.		
11. SUPPLEMENTARY NOTES N/A	12. SPONSORING MILITARY ACTIVITY USAF 5th Epidemiological Flight Aerospace Medical Division (AFSC) APO San Francisco	
13. ABSTRACT  Data is presented on the occurrence and human disease relationships of mosquitoes on USAF installations located in the Republic of Vietnam. Information contained in this report is based upon the identification of mosquito specimens submitted to the USAF 5th Epidemiological Flight by USAF Military Public Health personnel from 10 USAF installations in RVN over a 24-month period between 1 June 1966 and 1 June 1968.  Mosquito surveys were accomplished on a routine basis in connection with the objectives of the USAF Aerospace Medicine Program to prevent and control vector-borne diseases.  A total of 94 different species of mosquitoes were identified from all collections. Of this number, 22 species or 23.4 percent, are known vectors of human disease.		

DD FORM 1 JAN 64 1473

**UNCLASSIFIED**

**Security Classification**

## UNCLASSIFIED

Security Classification

(Reverse of Form DD 1473)

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Mosquito occurrence Disease-Vector surveillance and control Human disease relationships Mosquito-borne disease incidence Military Public Health Air Force Installations Republic of Vietnam						
<b>INSTRUCTIONS</b>						
1. ORIGINATING ACTIVITY: Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity, or other organization (corporate author) issuing the report.	imposed by security classification, using standard statements such as:					
2a. REPORT SECURITY CLASSIFICATION: Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.	(1) "Qualified requesters may obtain copies of this report from DDC."					
2b. GROUP: Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.	(2) "Foreign announcement and dissemination of this report by DDC is not authorized."					
3. REPORT TITLE: Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.	(3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through ."					
4. DESCRIPTIVE NOTES: If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.	(4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through ."					
5. AUTHOR(S): Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.	(5) "All distribution of this report is controlled. Qualified DDC users shall request through ."					
6. REPORT DATE: Enter the date of the report as day, month, year, or month, year. If more than one date appears on the report, use date of publication.	If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.					
7a. TOTAL NUMBER OF PAGES: The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.	11. SUPPLEMENTARY NOTES: Use for additional explanatory notes.					
7b. NUMBER OF REFERENCES: Enter the total number of references cited in the report.	12. SPONSORING MILITARY ACTIVITY: Enter the name of the departmental project office or laboratory sponsoring (paying for) the research and development. Include address.					
8a. CONTRACT OR GRANT NUMBER: If appropriate, enter the applicable number of the contract or grant under which the report was written.	13. ABSTRACT: Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.					
8b, 8c, & 8d. PROJECT NUMBER: Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.	It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as (TS), (S), (C), or (U).					
9a. ORIGINATOR'S REPORT NUMBER(S): Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.	There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.					
9b. OTHER REPORT NUMBER(S): If the report has been assigned any other report numbers (either by the originator or by the sponsor), also enter this number(s).	14. KEY WORDS: Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, rules, and weights is optional.					
10. AVAILABILITY/LIMITATION NOTICES: Enter any limitations on further dissemination of the report, other than those						